Experiments on
Right-and-Left-Handedness

HELLER & LINDEMANN

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AMERICAN FOUNDATION
FOR THE BLIND INC.

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Experiment Done by Muriel L. Heller
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PROBLEM:

To prove or disprove Parsons' theory of ocular dominance with regard to handedness. The theory states that the dominant hand corresponds to the dominant eye.

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CASES:

Total number- 40

Totally blind- 3

Right eye dominant- 14

Left eye dominant- 10

Cases in which it was impossible to discover which eye was dominant- 13

PART I

Totally Blind

Section I

A-Apparatus:

Extensor Dynamometer

B-Procedure:

S stands in front of E[1] with his right arm easily extended before him, and inserts his thumb and second finger in the thimbles attached to the extensor dynamometer, using the rings if his fingers are too large for the thimbles. S extends these fingers as far as possible, while E[2] records the measure indicated on the scale of the instrument. S repeats this operation three times, and follows the same procedure with the corresponding fingers of the left hand. The same method is used, alternating the right and left hands, in the following combinations of fingers, and in the following order: thumb and 2nd; 3rd and 4th; thumb and 5th; 2nd and 3rd; 4th and 5th; thumb and 3rd; thumb and 4th.

C-Results:

Table 1- Figures from the actual experiment

Table 2- Mean averages, mean variations, greatest variations, and smallest variations of Table 1

Table 3- Averages of mean averages and of mean variations of Table 2

Section II

A-Materials:

Broom

Small rubber ball

Book

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B-Procedure:

1-Uni-manual

a-The ball is placed directly in front of S. who picks it up and throws it.

b-A book is placed on the table directly in front of S. who is told to pick it up.

2-Major bi-manual

The broom is leaning against the wall. S. is told to pick it up and pound the floor a few feet in front of him.

3-Minor bi-manual

The broom is leaning against the wall. S. is told to take it and sweep the floor.

NOTE: S. is not told which hand to use in any of these procedures. E^2 records the preferred hand in each case.

4-Dominant thumb

S. is asked to fold his hands. E^2 records the dominant thumb.

C-Results:

Table 4

PART II

Cases in which it was possible to discover which eye was dominant

Section I

Same as in PART I, Section I

Section II

Same as in PART I, Section II

Section III

A-Apparatus:

Manoptoscope

Red cardboard

Flashlight

B-Procedure:

E^1 holds the manoptoscope firmly before S's eyes, while E^2, holding the cardboard on a level with S's eyes, approaches from a distance until S is able to see the card. S. is told to fixate the white spot in the center of the card. Then S. is told to close his right eye and state whether or not he can see the white spot. He repeats this with the left eye closed and the right open. E^2 records the dominant eye.

NOTE: In case S. could merely distinguish lights and shades, a flashlight was substituted for the cardboard and the experiment was conducted in a dark room.

C-Results:

The results are shown in the division of the subjects into three groups.

PART III

Cases in which it was impossible to discover which eye was dominant

Section I

Same as in PART I, Section I

Section II

Same as in PART I, Section II

Section III

Same as in PART II, Section III, except that no results were obtainable, since the subjects were unable to close one eye without closing the other.

SUMMARY OF RESULTS

Part I: Totally Blind

Mean Averages:

(A) Th. & 2: R stronger than L by 22/144

Th. & 3: R stronger than L by 38/144

Th. & 4: R stronger than L by 32/144

Th. & 5: R stronger than L by 12/144

2 & 3: R stronger than L by 20/144

3 & 4: R stronger than L by 1/144

4 & 5: R stronger than L by 13/144

(B) Following order presents combinations ranging from strongest to weakest:

R:	L:
Th. & 3	Th. & 3
Th. & 4	Th. & 4
Th. & 2	Th. & 2
Th. & 5	Th. & 5
2 & 3	2 & 3
3 & 4	3 & 4
4 & 5	4 & 5

(C) Right hand stronger than left, without exception.

Mean Variations:

(A) Mean variation greater for right hand than for left in four of the seven combinations:

Th. & 2
Th. & 3
Th. & 4
2 & 3

Dominating Hand and Thumb:

(A) Subject 1: RLL L
2: RRR L
3: RLR R

(B) Out of three subjects,
3 used R for both uni-manual activities
2 used L for minor bi-manual activities

2 used R for major bi-manual activities

2 had L thumb dominant

Part II: Cases in which it was possible to discover which eye was dominant:

Right eye dominant:

Mean Averages:

(A) Th. & 2: R stronger than L by 262/672

Th. & 3: R stronger than L by 155/672

Th. & 4: R stronger than L by 42/672

Th. & 5: R stronger than L by 111/672

2 & 3: L stronger than R by 36/672

3 & 4: R stronger than L by 6/672

4 & 5: R stronger than L by 31/672

(B) Following order presents combinations ranging from strongest to weakest:

R: Th. & 3	L: Th. & 3
Th. & 2	Th. & 4
Th. & 4	Th. & 2
Th. & 5	Th. & 5
2 & 3	2 & 3
3 & 4	3 & 4
4 & 5	4 & 5

(C) Right hand stronger than left in every case except one (2 & 3)

Mean Variations:

(A) Mean variation greater for left hand than for right in every case except 2 & 3

Dominating Hand and Thumb:

(A) Subject 4: RRL L

5: RLL R

6: RRL R

7: RLL R

8: RLL L

9: RRL L

10: RLL L

11: RLL L

12: RRR R

13: RRL R

14: RRR R

15: RRR R

16: RLL R

17: RLL R

(B) Out of 14 cases:

14 used R for both uni-manual activities

½ used R and ½ used L for minor bi-manual

11 used L for major bi-manual

9 had R thumb dominant

Left eye dominant:

Mean Averages:

(A) Th. & 2: L stronger than R by 11/480

Th. & 3: L stronger than R by 30/480

Th. & 4: L stronger than R by 26/480

Th. & 5: R stronger than L by 9/480

2 & 3: R stronger than L by 53/480

3 & 4: R stronger than L by 18/480

4 & 5: L stronger than R by 24/480

(B) Following order presents combinations ranging from strongest to weakest:

R:	L:
Th. & 3	Th. & 3
Th. & 4	Th. & 4
Th. & 2	Th. & 2
Th. & 5	Th. & 5
2 & 3	2 & 3
3 & 4	4 & 5
4 & 5	3 & 4

(C) In four cases out of seven, L is stronger than R.

Mean Variations:

Mean variation greater for left hand than right in four cases out of seven.

Dominating Hand and Thumb:

(A) Subject 18: RLR L
19: {RRL L
L
20: RLL L
21: {RRL L
L
22: RRL R
23: LLL R
24: RLL R
25: {RLL R
L
26: RLL L
27: RLL R

(B) Out of ten cases

9 used R for one uni-manual

6 used R for other uni-manual

6 used R for both uni-manual

7 used L for minor bi-manual

9 used L for major bi-manual

6 had R thumb dominant

CONCLUSIONS:

The results of the experiment seem to include points that are favorable and unfavorable to the Parsons' theory. Parsons holds the view that handedness and ocular dominance correspond, that is, a left-handed individual would have the left eye dominant, and a right-handed person would have the right eye dominant. The congenitally blind would therefore be ambidextrous. The results of the experiment seem to contradict this point for Tables III and IV, Part I show that the right hand is stronger in every case, and preferred in both uni-manual activities.

On the other hand, the evidence in favor of the theory seems to outweigh this. In the first place, Tables III and IV, Part II, show that in the case of subjects whose right eyes were dominant, the right hand was dominant and preferred. In the second place, in the case of the subjects whose left eyes were dominant, the left hand was stronger but the right was preferred. This also bears out the Parsons' theory, for the results from unlearned activities such as those functioning in the use of the extensor dynamometer, indicate that these individuals were congenitally left-handed, in accordance with the ocular dominance. Table IV shows that the right hand was preferred in most cases, and this upholds Parsons' belief that many naturally left-handed individuals learn to use the right hand through social pressure.

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